FIG. 1

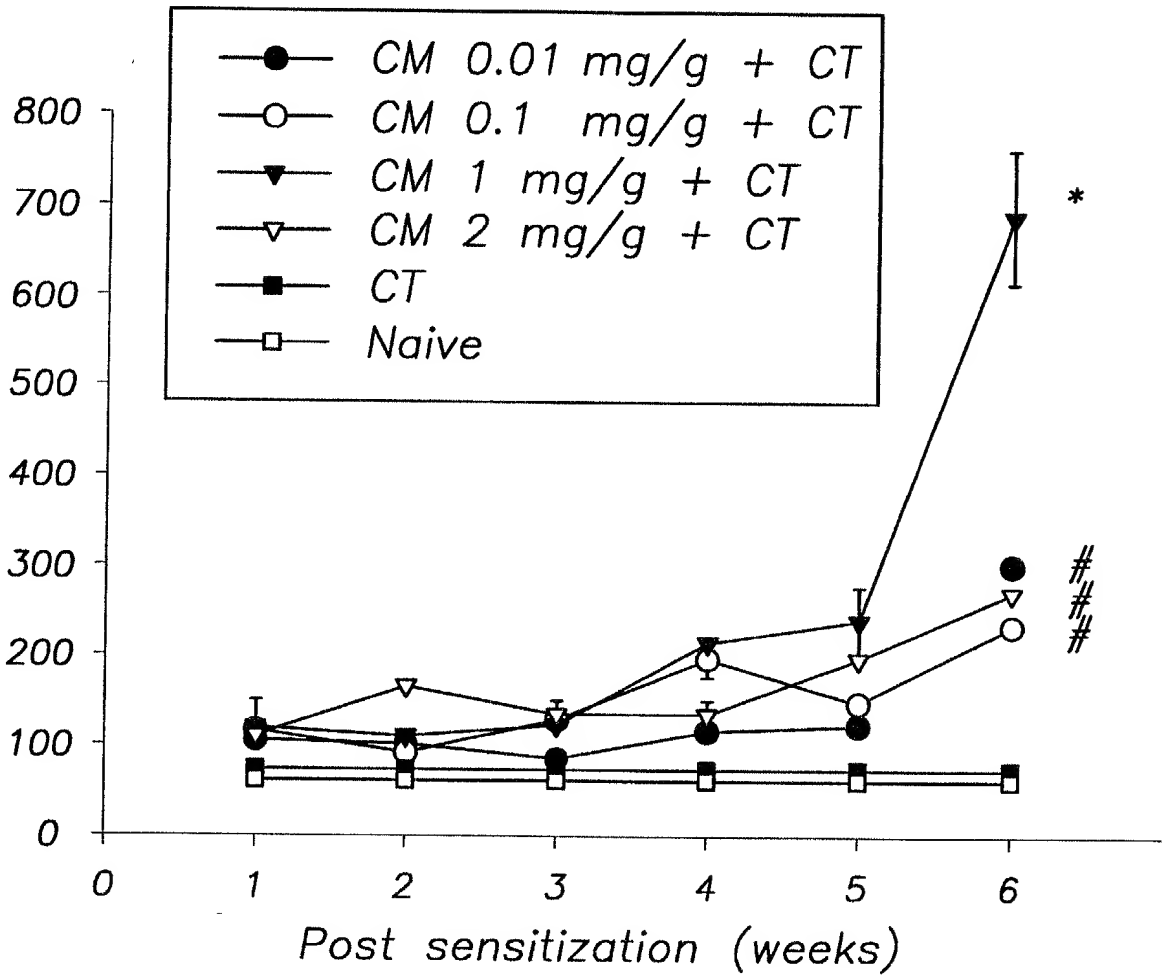

CM 0.01 mg/g + CT
CM 0.1 mg/g + CT
CM 1 mg/g + CT
CM 2 mg/g + CT
CT
Naive
IgE (ng/ml)
800
700
600
500
400
300
200
100
0
0
1
2
3
4
5
6
Post sensitization (weeks)
*
#
#
#

FIG.2

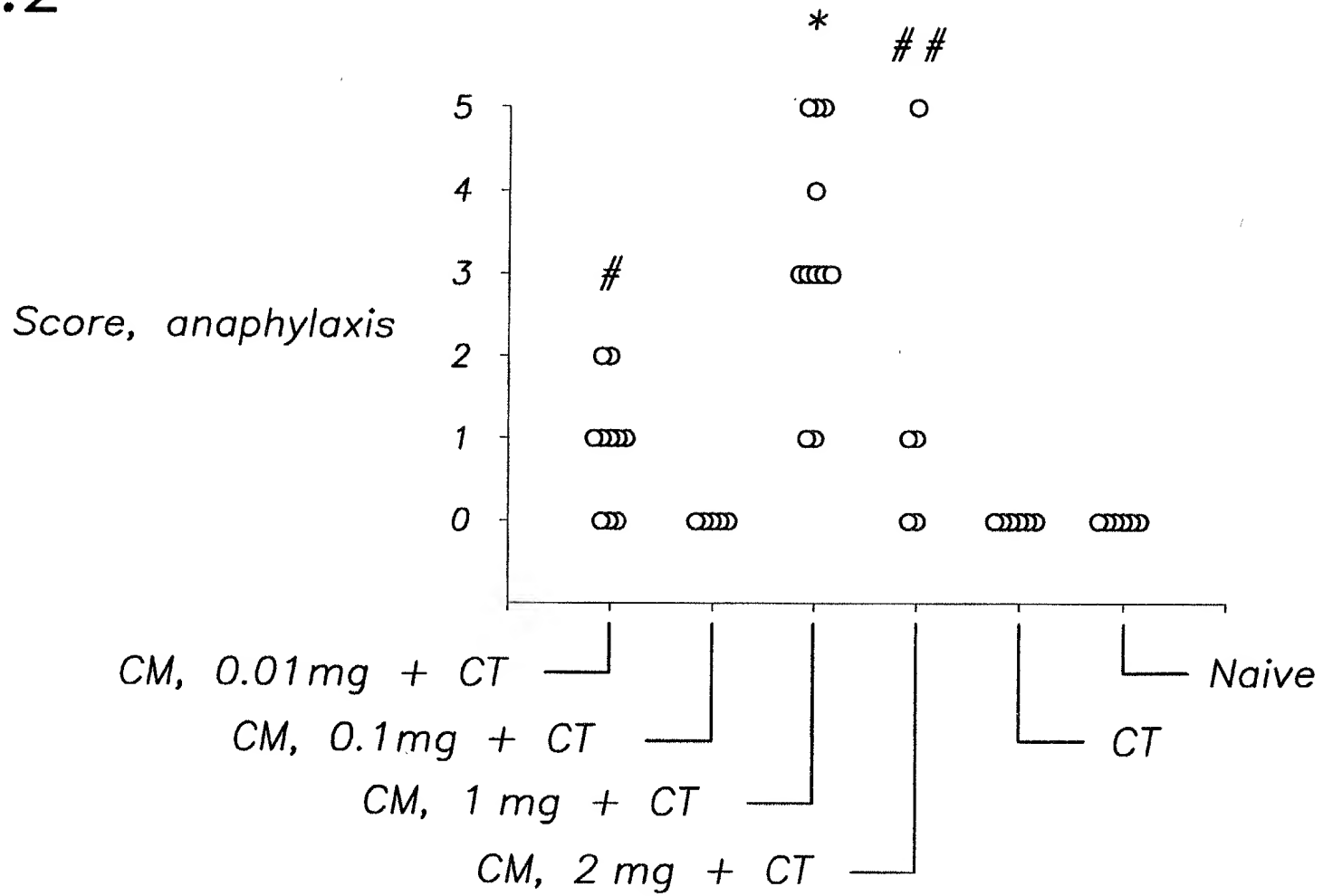

*
# #
5
4
3
#
2
1
0
Score, anaphylaxis
CM, 0.01mg + CT
CM, 0.1mg + CT
CM, 1 mg + CT
CM, 2 mg + CT
CT
Naive

FIG.3

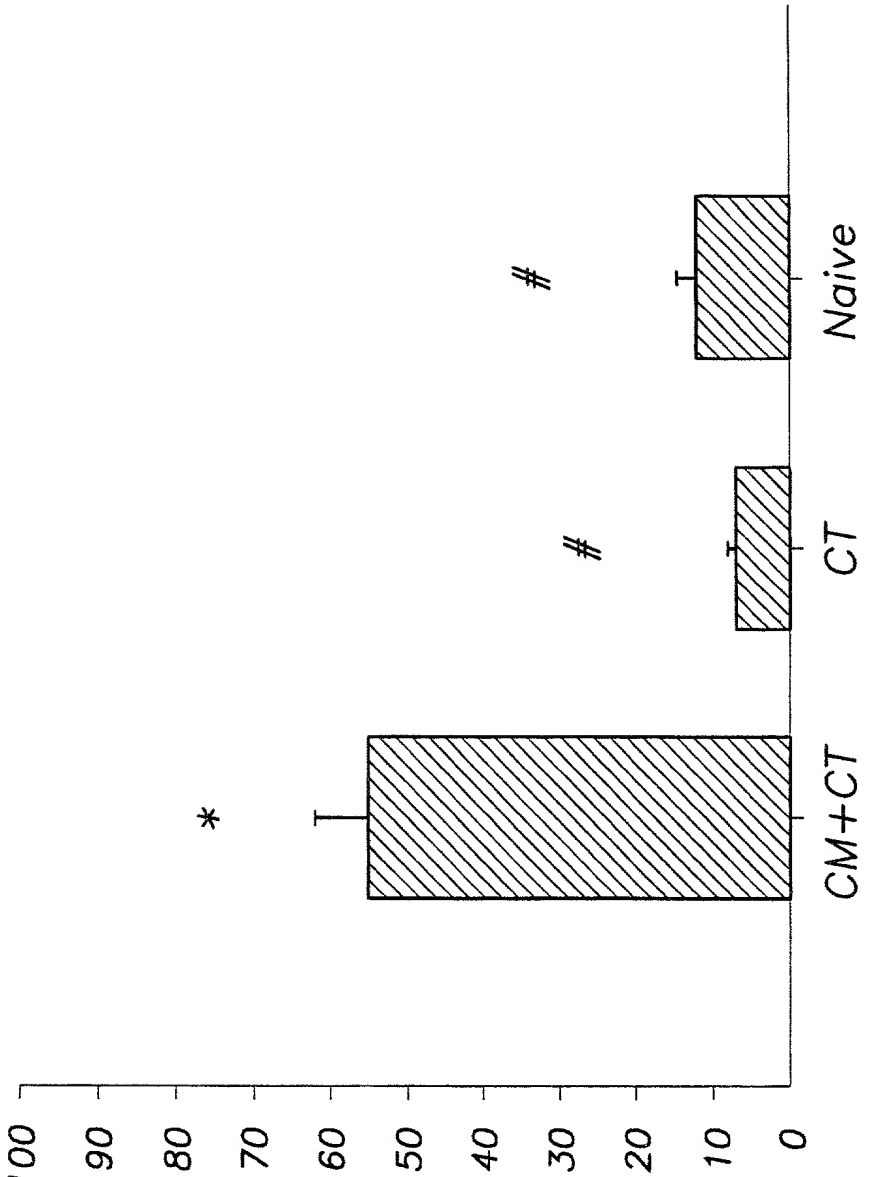

% of degranulated mast cells
100
90
80
70
60
50
40
30
20
10
0
*
#
#
CM+CT
CT
Naive

FIG. 4A (Week 3, first challenge)

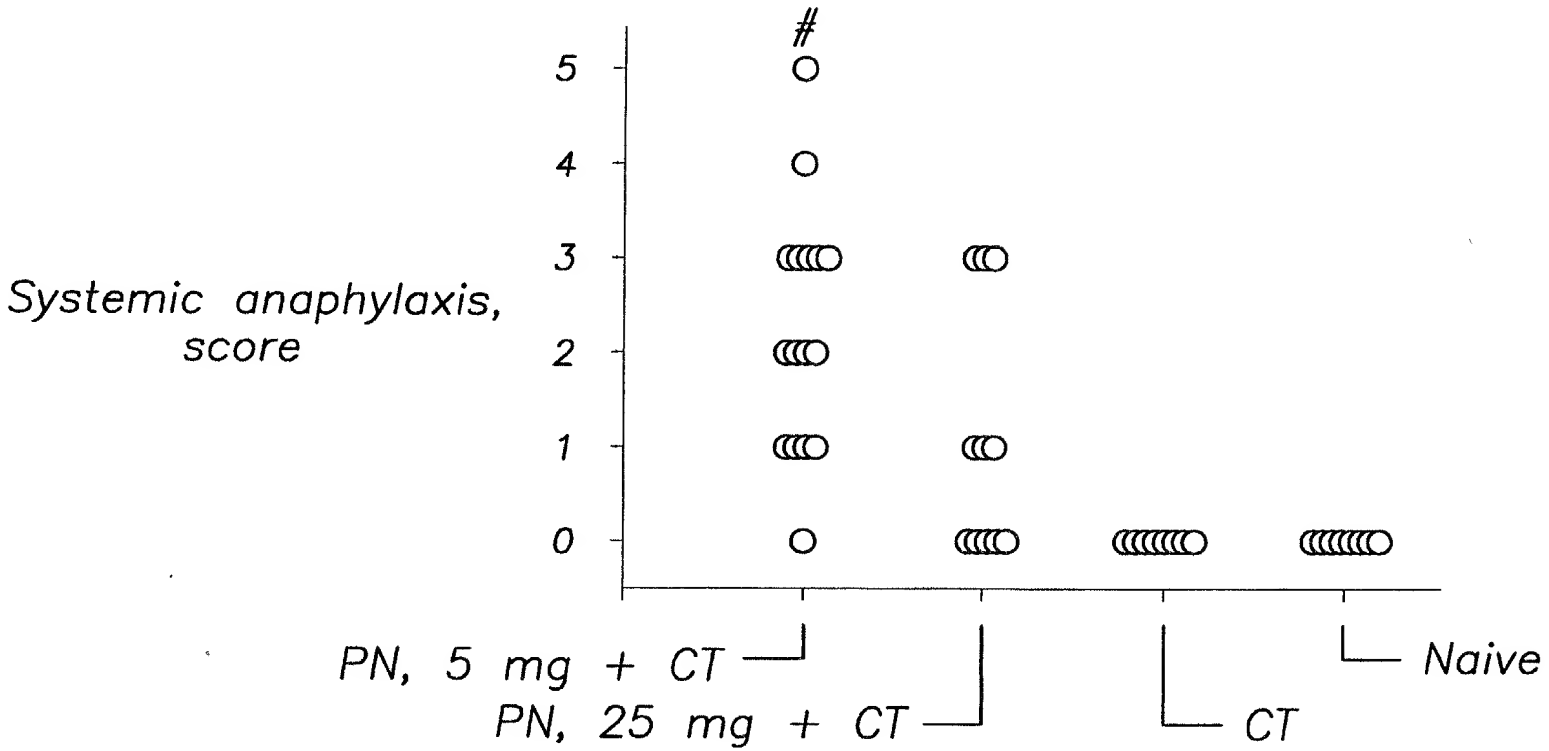


FIG. 4B (Week 5, re-challenge)

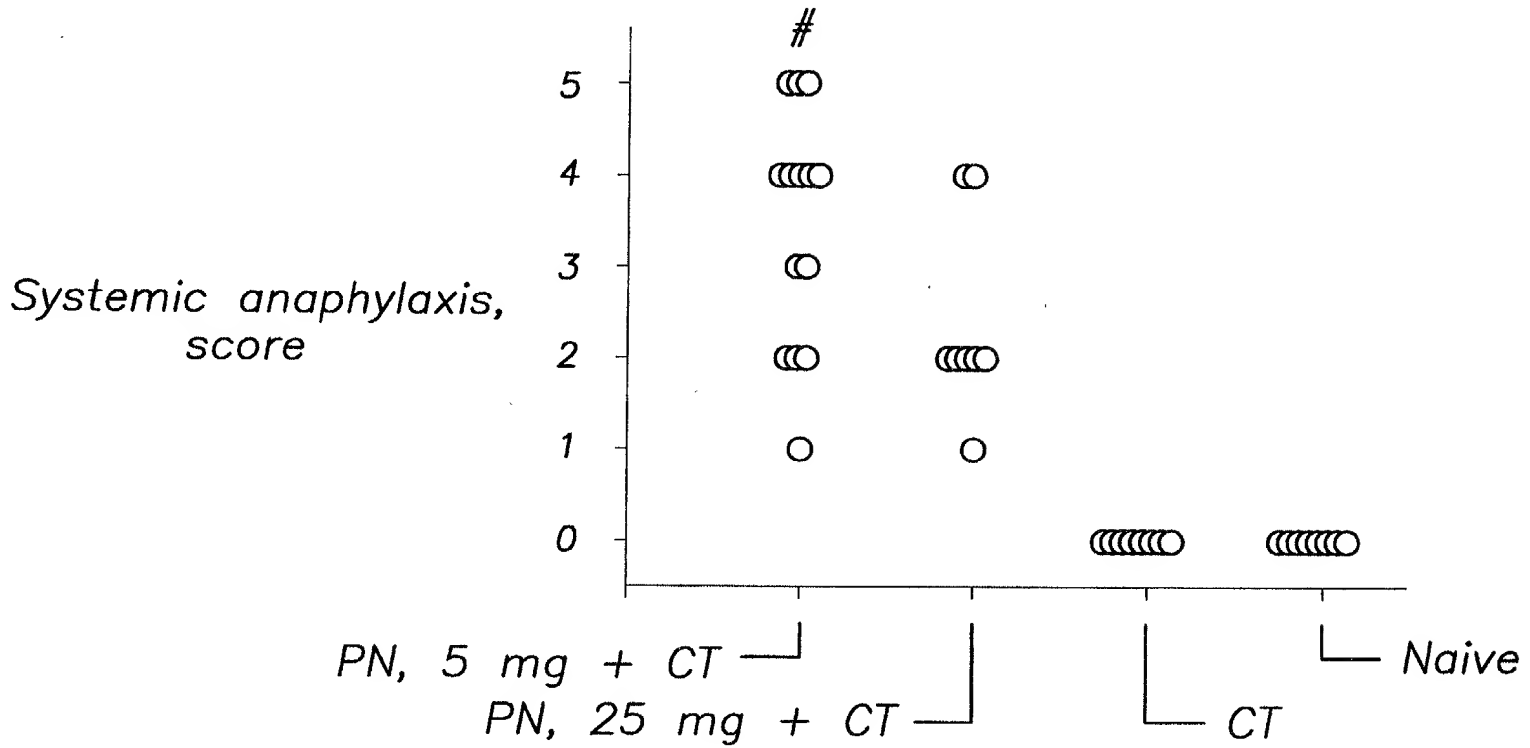


FIG. 5A

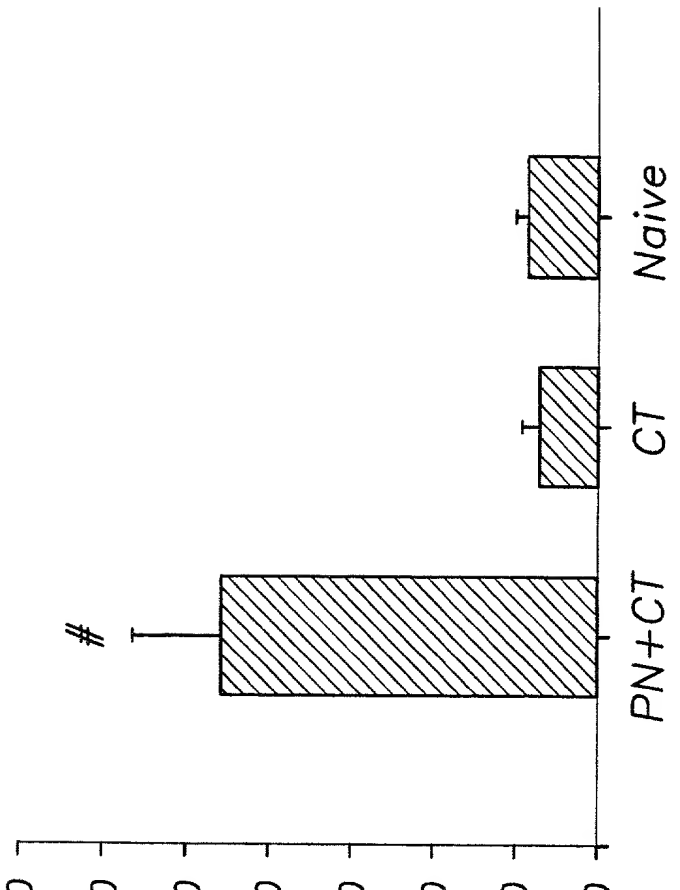


FIG.5B

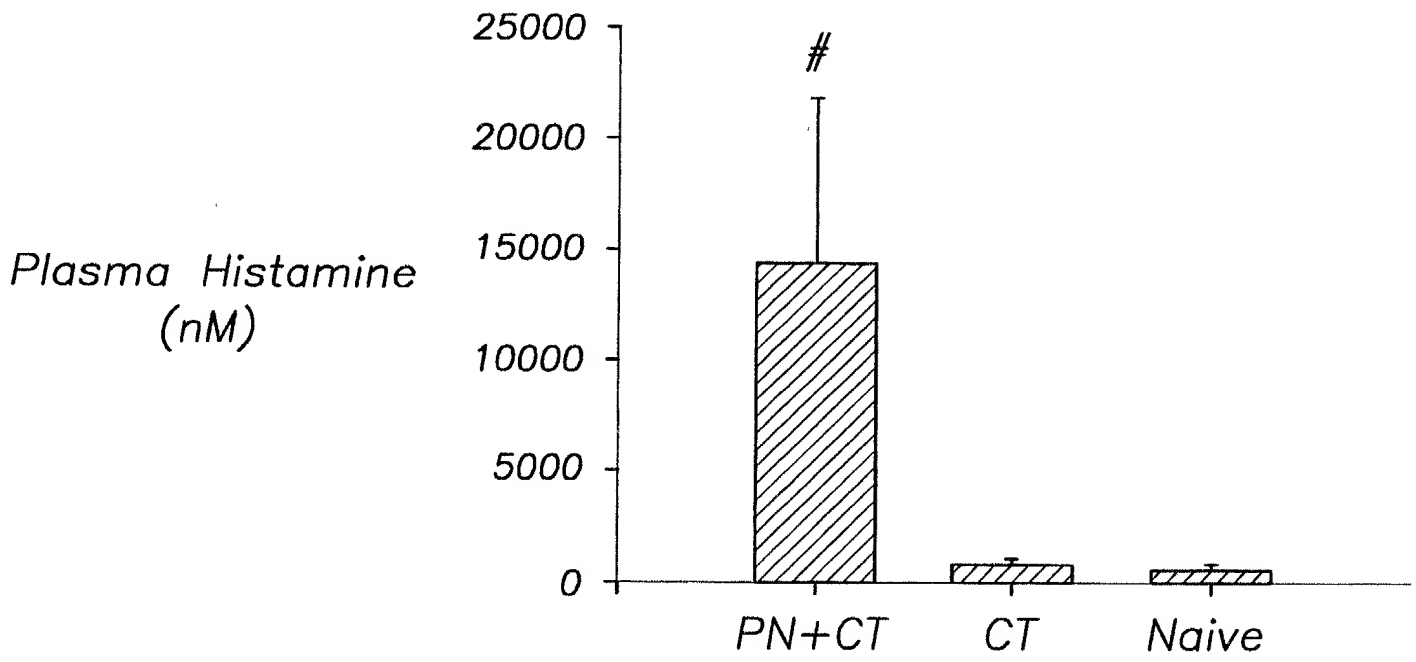

Plasma Histamine
(nM)
25000
20000
15000
10000
5000
0
#
PN+CT
CT
Naive

FIG.6

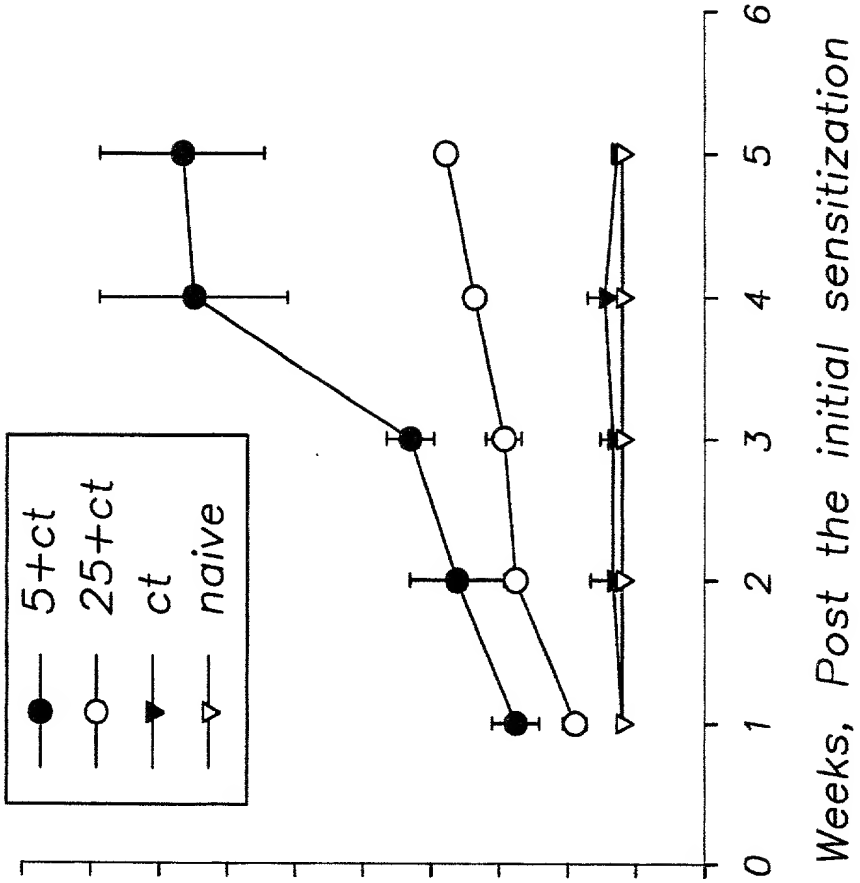

5+ct
25+ct
ct
naive
IgE (ng/ml)
1800
1600
1400
1200
1000
800
600
400
200
0
0
1
2
3
4
5
6
Weeks, Post the initial sensitization

FIG. 7

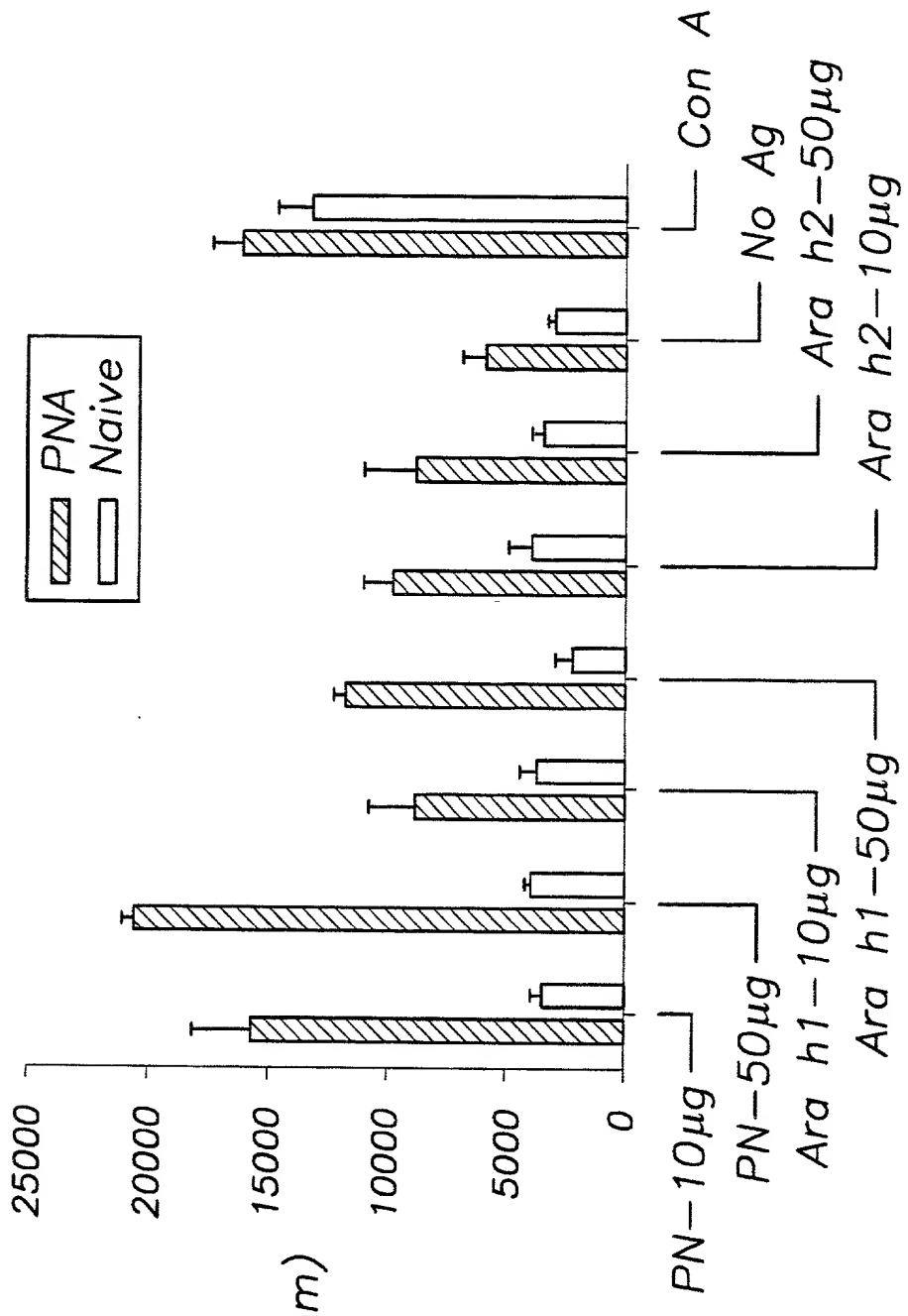

PNA
Naive
Proliferation (cpm)
25000
20000
15000
10000
5000
0
PN−10μg
PN−50μg
Ara h1−10μg
Ara h1−50μg
Ara h2−10μg
Ara h2−50μg
No Ag
Con A

FIG.8

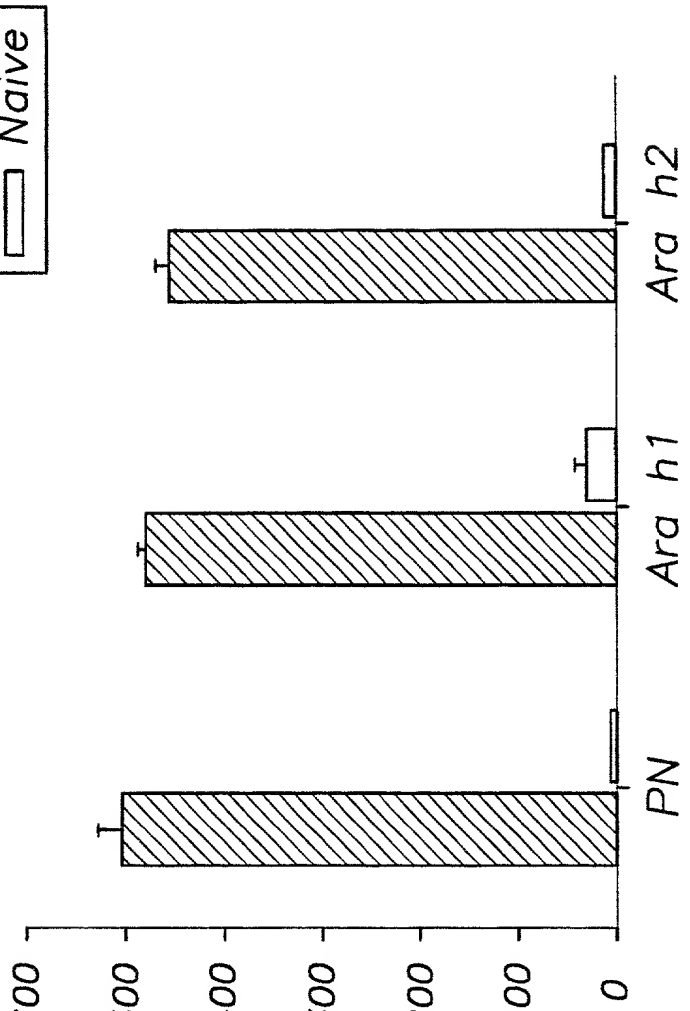


FIG. 9A

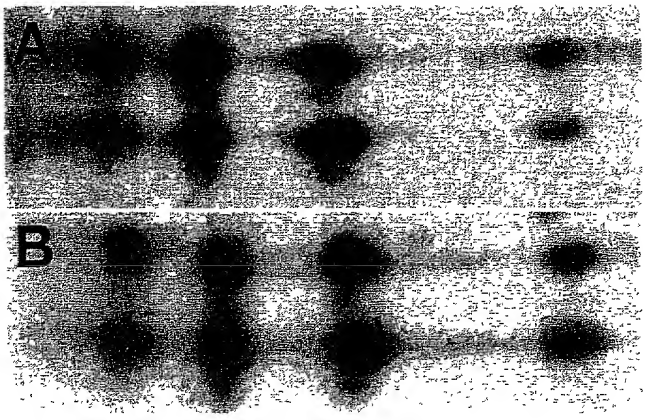


FIG. 9B

FIG. 10A

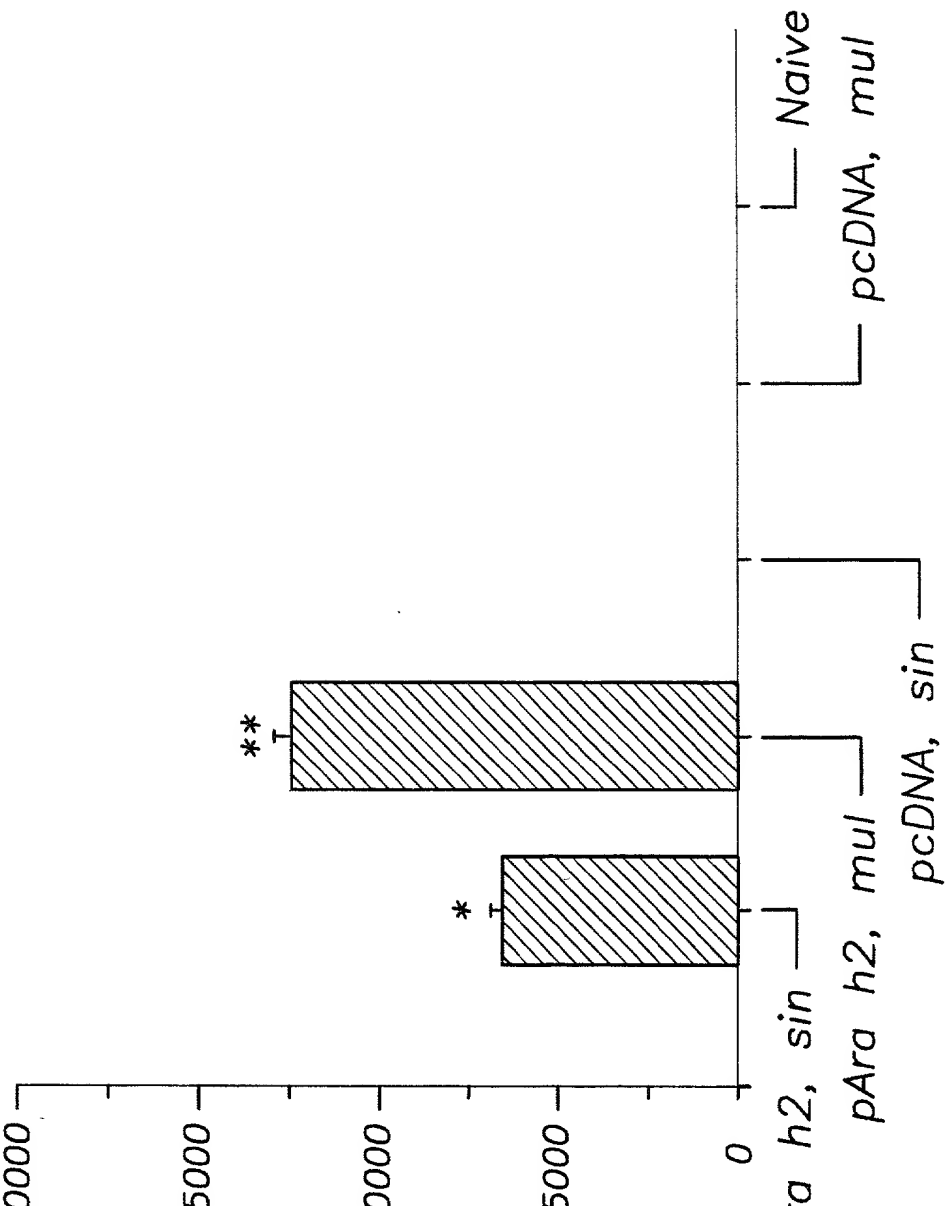

IgG2a (ng/ml)
20000
15000
10000
5000
0
**
*
pAra h2, sin
pAra h2, mul
pcDNA, sin
Naive
pcDNA, mul

FIG. 10B

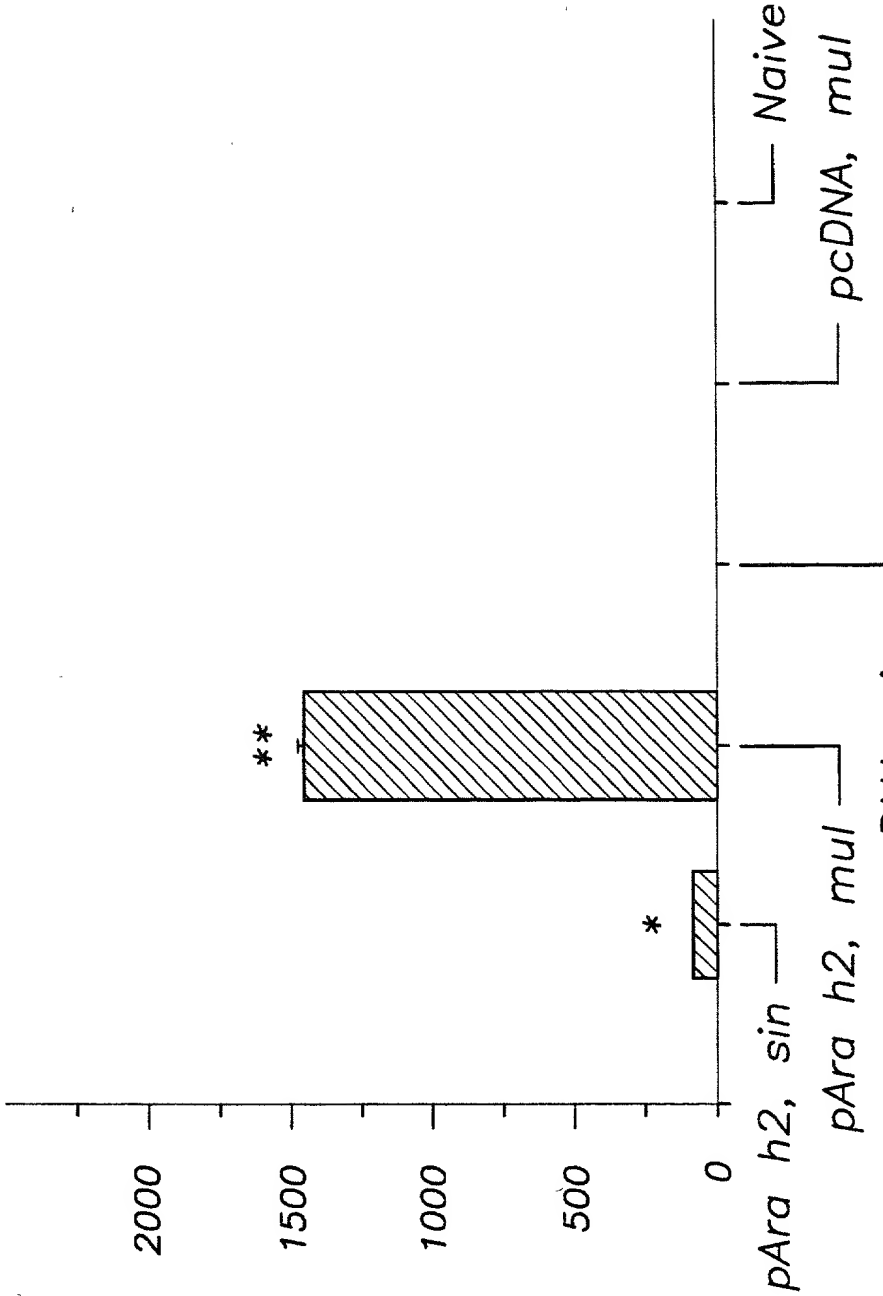

IgG1 (ng/ml)
2000
1500
1000
500
0
**
*
pAra h2, sin
pAra h2, mul
pcDNA, sin
Naive
pcDNA, mul

FIG. 11

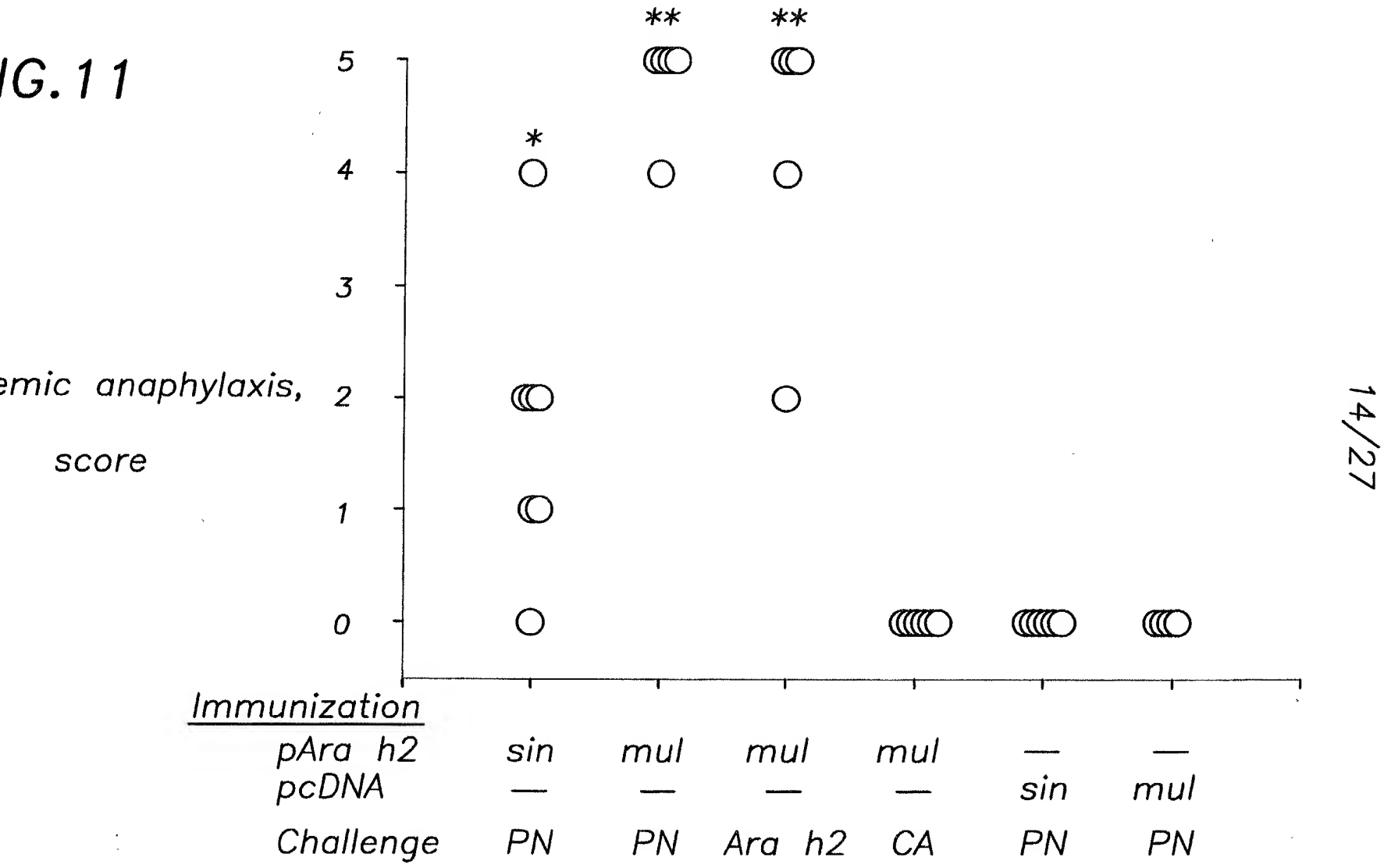

Systemic anaphylaxis, score
5
4
3
2
1
0
**
**
*
Immunization
pAra h2 sin mul mul mul — —
pcDNA — — — — sin mul
Challenge PN PN Ara h2 CA PN PN

FIG. 12

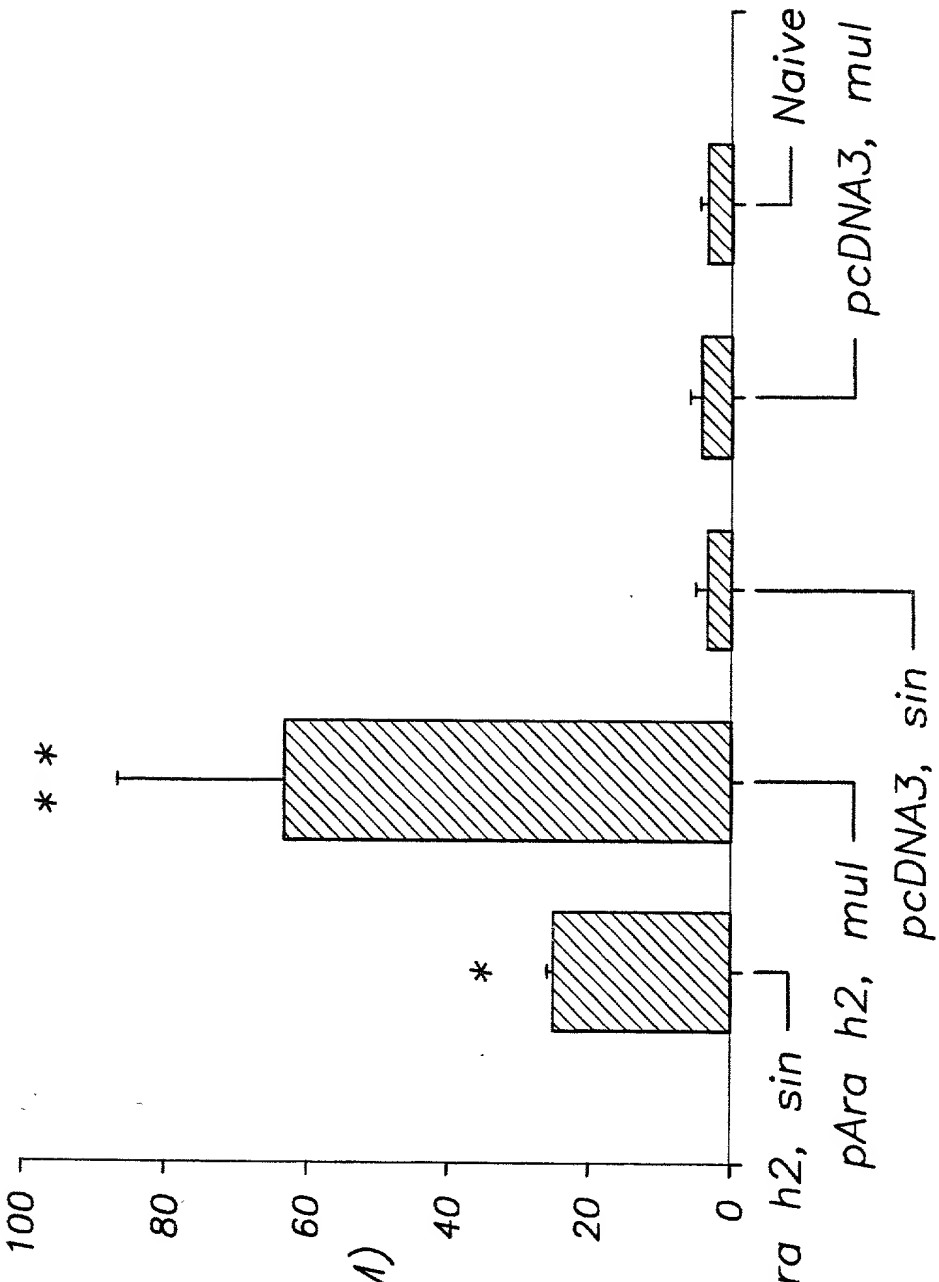

Histamine (μM)
100
80
60
40
20
0
* *
*
pAra h2, sin
pAra h2, mul
pcDNA3, sin
Naive
pcDNA3, mul

FIG. 13

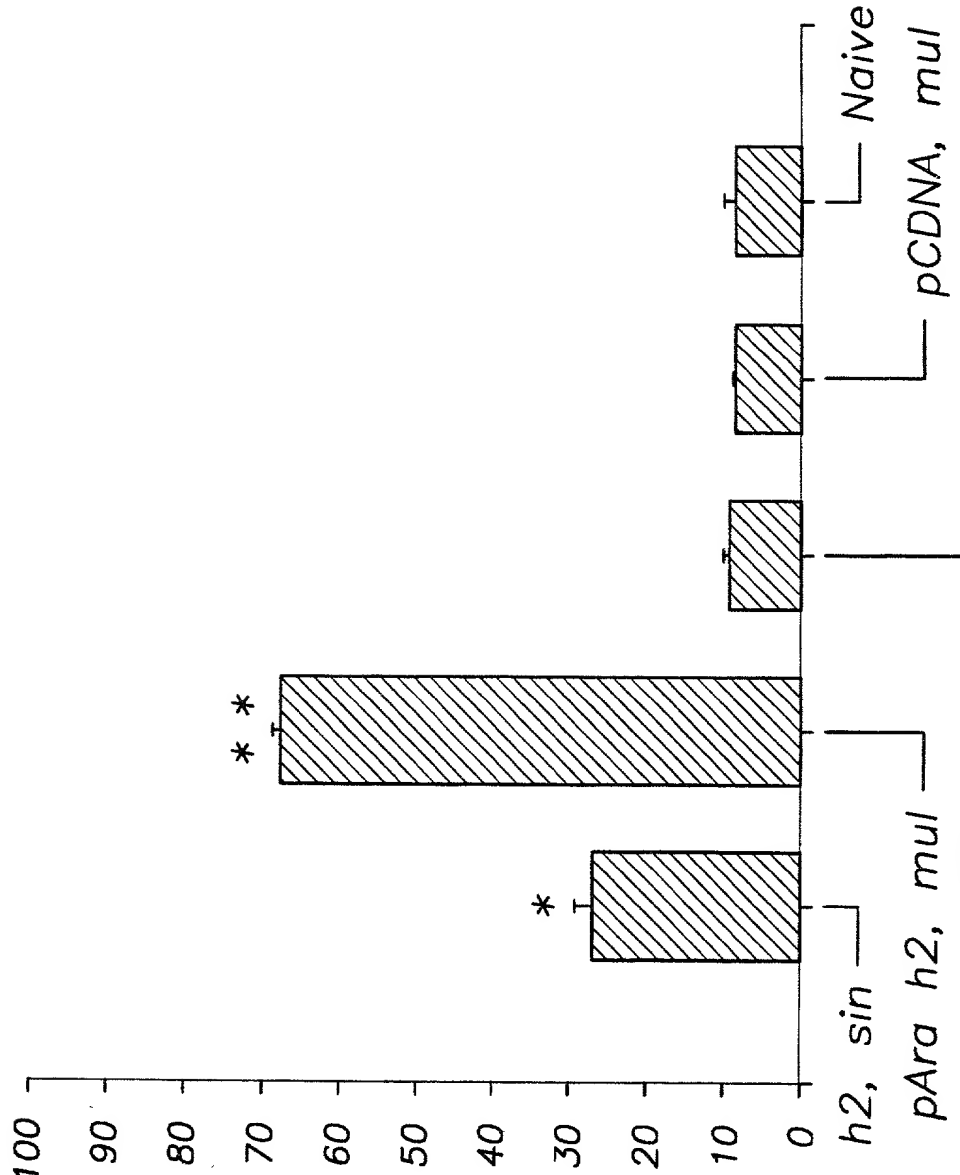

% of degtalulated mast cells
100
90
80
70
60
50
40
30
20
10
0
*
* *
pAra h2, sin
pAra h2, mul
pCDNA, sin
pCDNA, mul
Naive

FIG. 14A

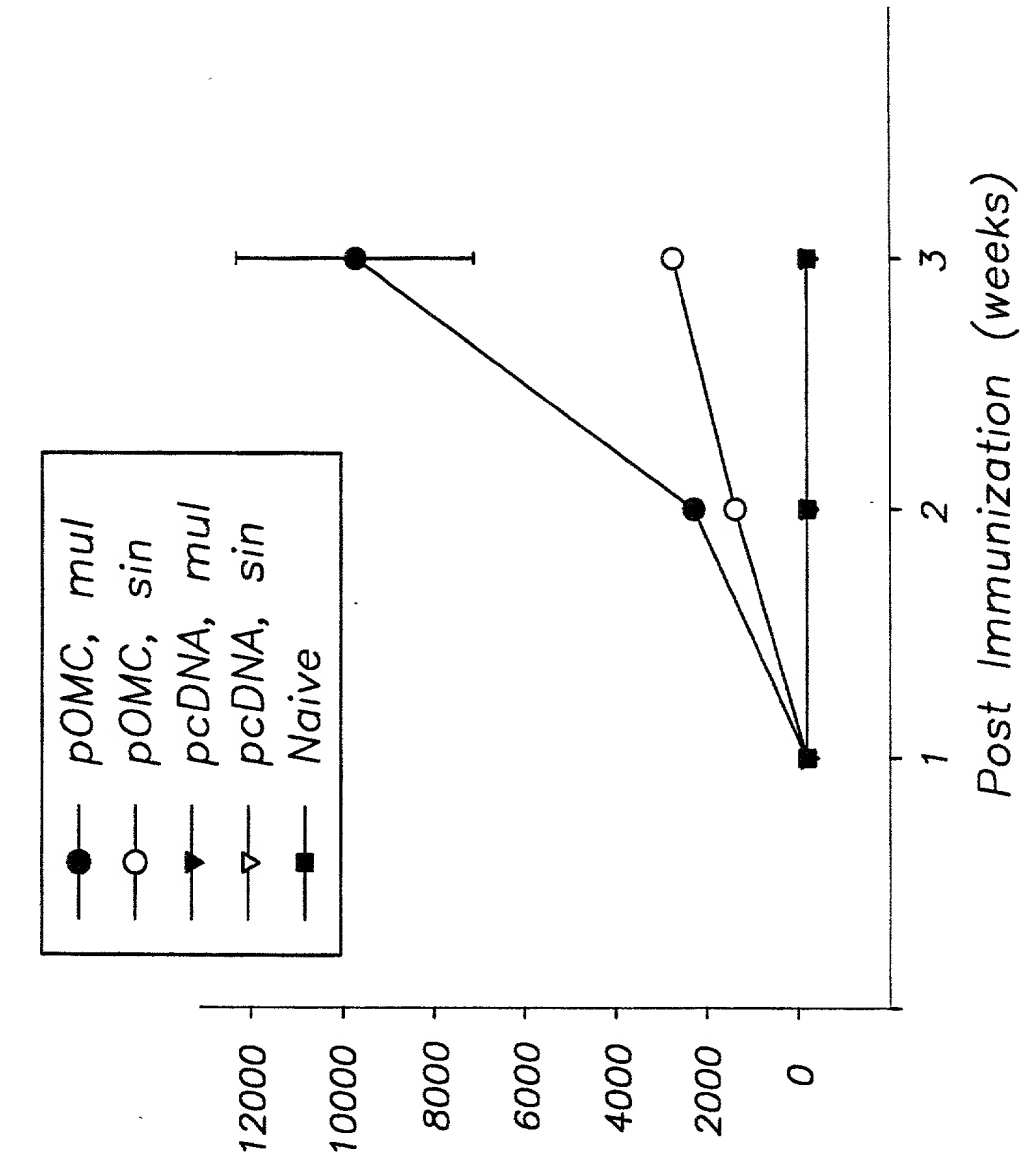

pOMC, mul
pOMC, sin
pcDNA, mul
pcDNA, sin
Naive
12000
10000
8000
6000
4000
2000
0
IgG2a (ng/ml)
1
2
3
Post Immunization (weeks)

FIG. 14B

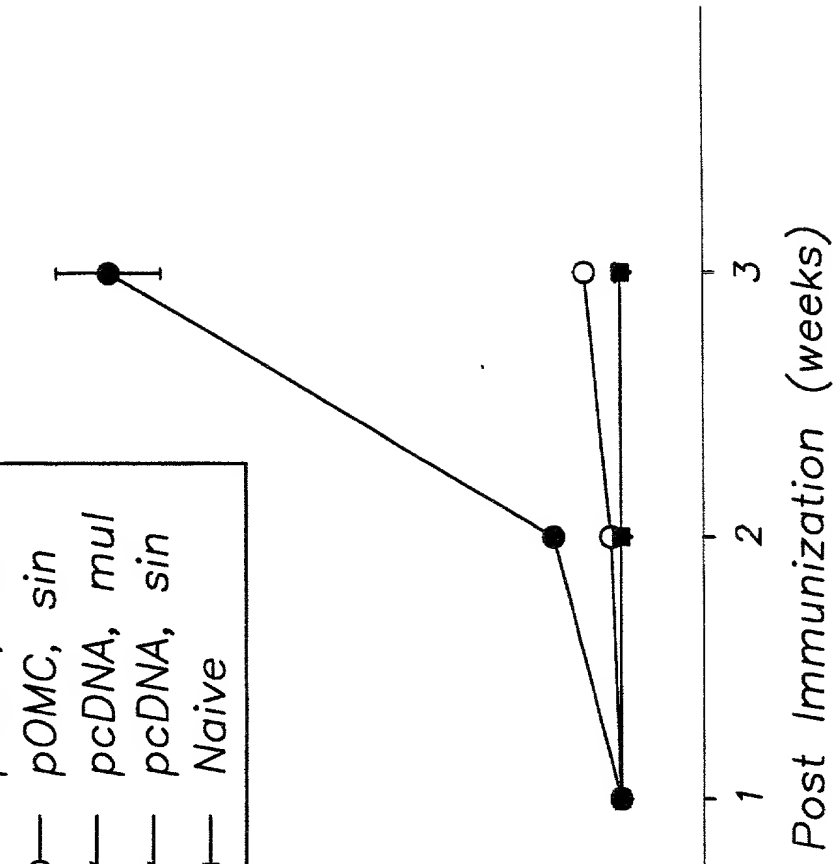

pOMC, mul
pOMC, sin
pcDNA, mul
pcDNA, sin
Naive
12000
10000
8000
6000
4000
2000
0
IgG1 (ng/ml)
1
2
3
Post Immunization (weeks)

FIG. 15A

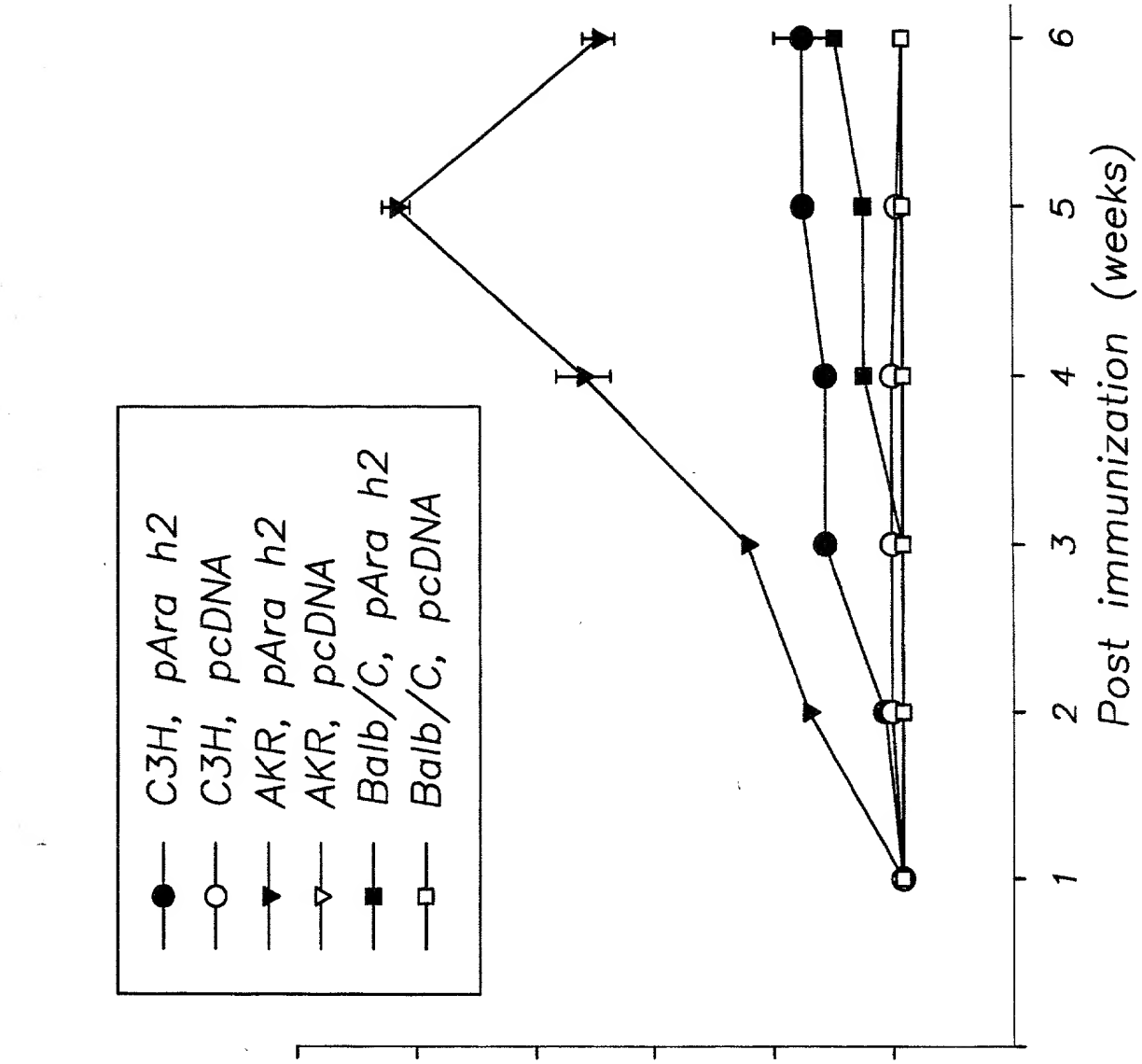

C3H, pAra h2
C3H, pcDNA
AKR, pAra h2
AKR, pcDNA
Balb/C, pAra h2
Balb/C, pcDNA
IgG2a (ng/ml)
100000
80000
60000
40000
20000
0
1
2
3
4
5
6
Post immunization (weeks)

FIG. 15B

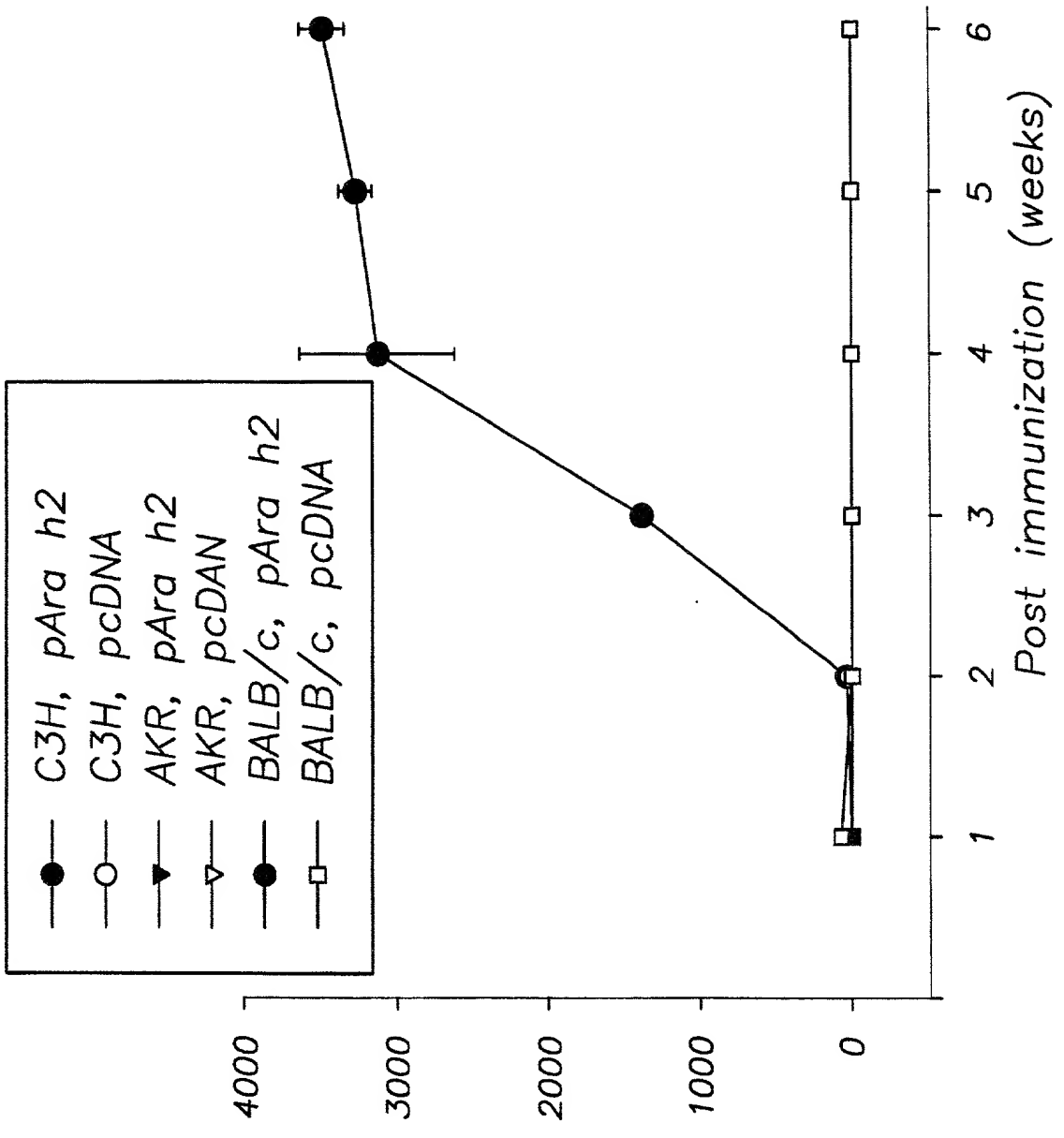

C3H, pAra h2
C3H, pcDNA
AKR, pAra h2
AKR, pcDAN
BALB/c, pAra h2
BALB/c, pcDNA
IgG1 (ng/ml)
4000
3000
2000
1000
0
1
2
3
4
5
6
Post immunization (weeks)

FIG. 16A

PEPTIDE →		Ara h	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10
PATIENT	1	5.3	0.9	2.9	3.8	7.8	0.9	0.9	0.7	1	0.9	0.7
PATIENT	2	4.3	0.7	1.4	1.3	2.4	0.9	0.8	0.7	0.7	1	0.7
PATIENT	3	2.8	1	1.8	1.6	2.4	1.1	1.1	1.4	1.7	1.3	1.3
PATIENT	4	1.8	1	0.6	0.8	2.1	1	0.5	0.7	1.4	0.7	0.8
PATIENT	5	5.5	2.1	1.1	0.7	0.8	1	1.3	0.7	1.5	0.5	0.6
PATIENT	6	20.8	1	1.6	2.2	1.7	1.4	1	1.8	2.7	2.6	1.2
PATIENT	7	1.5	0.7	0.5	0.7	0.9	0.9	0.7	0.9	1.1	0.8	0.7
PATIENT	8	6.5	2.4	1.2	1.3	1.1	0.9	1.1	1.4	0.8	0.9	0.8
PATIENT	9	9.2	1.1	1.1	6.3	1.2	1.5	1.2	1	1.2	1.3	0.8
PATIENT	10	11.7	0.7	0.6	0.7	0.6	1.3	0.5	0.6	0.9	0.6	0.5
PATIENT	11	2.1	0.7	0.7	0.5	0.6	0.5	0.3	0.6	0.5	0.5	0.5
PATIENT	12	1.1	1.4	1.6	1.8	2.8	1.5	1.5	1.4	1.3	1.5	1.2
PATIENT	13	0.9	1.3	1.9	1.9	2.8	2	1.6	2.4	1.9	1.5	1.5
PATIENT	14	4.8	1.2	1.6	1.5	1.9	1.6	1.9	1.3	1.6	1.8	1.3
PATIENT	15	6.9	0.7	1.1	1.8	2.1	1.1	1	1.1	1.1	1	0.8
PATIENT	16	10.2	0.7	1.6	2.7	10.9	2	0.9	2.1	2.1	1.4	1
PATIENT	17	4.2	1.4	1.6	2.8	2.6	1.3	1.4	1.7	1.6	1.1	1.3
PATIENT	18	3.9	1.5	1.7	2.9	3	1.5	1.2	1.3	1.3	1.9	1
PATIENT	19	3.4	1.5	1.2	2.6	1.4	1.7	0.9	1	1.4	1.2	1.1

21/27
TO FIG.16B

FIG. 16B

FROM FIG.16A

#11	#12	#13	#14	#15	#16	#17	#18	#19	#20	#21
0.9	1	0.8	1.2	0.9	1	1.2	1	5	7.3	6.6
0.7	0.6	0.5	1.1	0.7	0.7	0.7	0.5	1.9	4.3	3.4
1.7	0.9	0.9	1.3	1.2	1.4	1.2	1.1	1.1	1.4	1.4
0.7	0.5	0.6	1	1	0.7	0.7	0.7	1	1.4	1.6
0.7	0.3	0.8	0.8	0.7	0.5	0.5	0.6	4.4	2.2	1.6
1.4	1.2	1.2	1.1	0.9	0.7	1.4	3.9	0.6	0.7	0.9
1	1	0.7	0.8	1.1	1.1	0.7	1.2	1.2	1.4	1.4
1.2	1.3	1	1.2	1.4	1	1.1	3.5	1.3	1	1.2
0.8	1.5	0.9	0.8	0.9	1.1	0.7	1.9	1.4	1.3	1.4
0.5	0.8	0.7	0.4	0.5	0.7	0.7	0.6	1.6	1.2	1.1
0.8	0.5	0.7	0.7	0.4	0.4	0.7	0.6	0.6	0.5	0.8
1.1	1	1.1	1.4	1.4	1.1	1.3	1.2	1.3	1.9	2
1.7	1.9	1.4	1.2	1.5	1.3	1.5	2.3	1.6	1.3	1.8
1.1	1.3	0.9	0.9	1.2	1.1	1.5	5.1	3.5	2.2	2.1
1	1	1.2	1	0.7	1.2	1.4	2.2	1.2	1.1	1.4
0.8	0.9	0.8	0.6	0.8	0.7	0.7	1.6	3	2.5	5.8
1.2	1.7	1.7	1.1	1.7	1.5	1.6	1.2	1.4	1.2	1.3
1.3	1.2	0.9	1.7	1.7	1	1.6	2.1	3.4	3.8	6.3
1	1.3	1.1	1.4	1.6	1.3	1.3	1.3	1.4	1.5	1.7

TO FIG.16C

FIG. 16C

FROM FIG. 16B

#22	#23	#24	#25	#26	#27	#28	#29
6	3.4	4.6	6.4	7.5	5.1	11.3	0.9
3.6	1.4	1.4	1.5	1.9	1.5	2.2	0.5
2.1	1.1	0.7	1.2	1.2	1.3	0.9	1.2
2	1.2	1.1	1.4	1.4	1.5	1.1	0.6
2.5	1.4	1.7	1.9	2.2	1.7	3.3	0.5
0.8	1	0.7	0.9	0.6	0.7	1	1.5
2.3	1.5	1.6	1.3	1.5	1.4	1.8	0.6
1	1.1	1.8	1	1.1	1.5	1.3	1.3
0.5	1.5	1.5	1.2	1.2	1.6	1.1	2
1.3	1.3	0.7	1.5	1.3	1.5	1.4	0.6
0.6	0.6	0.7	0.7	0.8	0.8	0.5	0.5
1.5	1.3	1.3	1.7	1.8	1.1	1.3	1.4
1.6	1.5	1.7	1.6	1.7	2.2	1.3	1.4
1.9	1.6	1.5	2.8	3.3	2	2.7	1.1
1.4	0.9	1.2	1.5	1.5	1.4	1.1	0.9
16.8	1.4	1.7	4.9	3.3	5.3	12.1	1.4
1.7	1.2	1.2	1.9	1.6	1.4	2.9	1.2
7	1.6	1.8	2.7	3.5	4.3	5.1	1.6
2.4	1.4	1.6	1.5	1.3	1.2	1.7	0.9

FIG. 17A

Modified Ara h 1:

MASMTGGQMGRDPNSSS THAKSSPYQAKT ENPCAQRCLQSCQQEPDALK

QKACESRCTKLEYDPRCAYDPRGHTGTTNQRSPPGEATRGRQPGDYDDARRQPRAEEGGR

WGPAGPRERERREEDARQPREDWARPSHQQPRKARPEGREGEQEWGTPGSHVREETSRNNP

FYFPSRRFSTRYGNQNGRIRVLQRFDQRSRQFQNLQNHRIVQIEAKPNTLVLPKHADADN

ILVIQQGQATVTVANGNNRKSFNLDEGHALRIPSGFISYILNRHDNQNLRVAKISMPVNT

PGQMEDFFPASSRDQSSYLQGFARNTLEAAFNAEANEIRRVLLEENAGGEQEARGQRRWS

TRSSENNEGVIVKVSKEHVEELTKHAKSVSKKGSEEEGDITNPANLREGEPDLSNNFGKL

AEVKPDKKNPQLQDLDMMLTCVEIKEGALMLPHFNSKAMVIVVVNKGTGNLELVAVRKEQ

QQRGRREEEEDEDEEEEGSNREVRAYTARLKEGDVFIMPAAHPVAINASSELALLGFGIN

AENNHRIFLAGDADNVIDQIEKQAKALAAPGSGEQVEKLIKNQKESHFVAARPQSQSQSP

SSPEKESPEKEDQEEENQGGKGPLLSILKAFN KLAAALEHHHHHH (SEQ ID NO. 109)

FIG. 17B

Modified Ara h 2:

MASMTGGQMGRDPNS ARQQAELQGDRRCQSQLARANLRACEAHLMQKIQ

ADEDSYERAPYSPSQAPYSPSPYDRRGAGSSQHQERCCNELNEFENNQRC

MCEALQQIMENQSDRLQGAQQEQQFKREARNLPQQCGLRAPQRCDADVES

GGRDRY AAALEHHHHHH (SEQ ID NO. 108)

FIG. 17C

Modified Ara h 3:

M ASFRQQPEENACQFQRLNAQRPDNRIESEGGYIETWNANNQEFECAGV

ALSRLVLRRNALRRPFYSNAPQEIFIQQGRGYFGLIFPGCPRHYEEPHTQGRRSQSQRPP

RRLQGEDQSQQQRDSHQKVHRFDEGDLIAVPTGVAFWLYNDHDTDVVAVSLTDTNNNDNQ

LDQFPRRFNLAGNTEQEFLRYQQQSRQSRRRSLPYSPYSPQSQPRQEEREFSPRGQHSRR

ERAGQEEENEGGNIFSGFTPEALFQAFQVDDRQIVQNLRGETESEEEGAIVTVRGGLRAL

SPDRKRRADEEEEYDEDEYAYDEEDRRRGRGSRGRGNGIEETICTASAKKNIGRNRSPDI

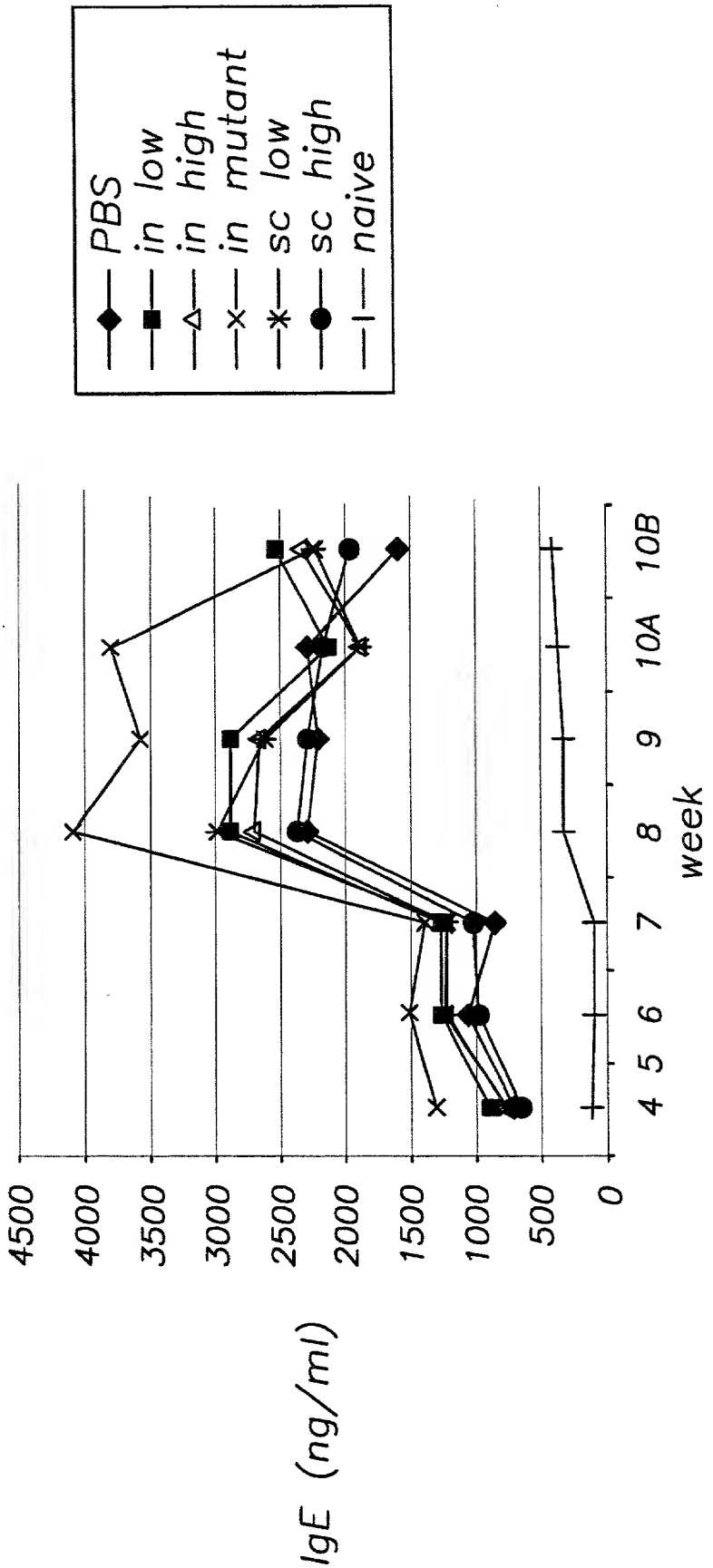
YNPQAGSLKTANDLNLLILRWLGPSAEYGNLYRNALFVAHYNTNAHSIIYRLRGRAHVQV

VDSNGNRVYDEELQEGHVLVVPQNFAVAGKSQSENFEYVAFKTDSRPSIANLAGENSVID

NLPEEVVANSYGLQREQARQLKNNNPFKFFVPPSQQSPRAVA VDKLAAALEHHHHHH

(SEQ ID NO. 110)

FIG. 18


Ah2exp3
IgE (ng/ml)
4500
4000
3500
3000
2500
2000
1500
1000
500
0
4 5 6 7 8 9 10A 10B
week
PBS
in low
in high
in mutant
sc low
sc high
naive